626-PA-6006

OP Vol. 1

MP MASTER

MA23086

1000 - PA - 1616
WA OREGON - MT
11.107 90

WARNING

Because of possible shock or fire hazards, connection of this instrument should be performed in compliance with the National Electrical Code (ANSI C1) and/or any other requirements which may be applicable to the user.

Installation, operation, and maintenance should be performed only by qualified personnel.

IMPORTANT NOTICE

The accessories supplied with this unit are an integral part of its operation. The loss, damage or misplacement of the accessories may result in it not being completely operational or usable.

All accessories must be returned to Electro Rent at the termination of the rental period.

Failure to return all accessories complete and in usable condition will result in costs of replacement accessories.

ELECTRO RENT CORPORATION
Call Toll Free
(800) 421-2337 Calif. (800) 232-2173

TM-110390AU

VOLUME I

OPERATORS'S MANUAL

626-PA-6006

AC NEUTRAL MONITOR

NOTE: Refer to Volume 2 (Service Manual) of TM-110390AU for maintenance data.

1 January 1983
(Rev. 1 September 1983)

© COPYRIGHT 1981, 1982, 1983 BY DRANETZ TECHNOLOGIES, INC. EDISON, NEW JERSEY. ALL RIGHTS RESERVED.

DRANETZ

DRANETZ TECHNOLOGIES, INC.
1000 New Durham Road, CN-91, Edison, N.J. 08818

Manual Effectivity

Instruction Manual TM-110390AU provides operating instructions for 626-PA-6006 plug-ins having differential signal inputs. These units have three circuit voltage input connectors or terminal blocks on the rear panel. Units received after October, 1982 will probably be of the differential input type.

If a 626-PA-6006 has a two-circuit voltage input connector or terminal block, TM-110390 applies.

TABLE OF CONTENTS

626-PA-6006 AC NEUTRAL MONITOR (TM-110390AU)

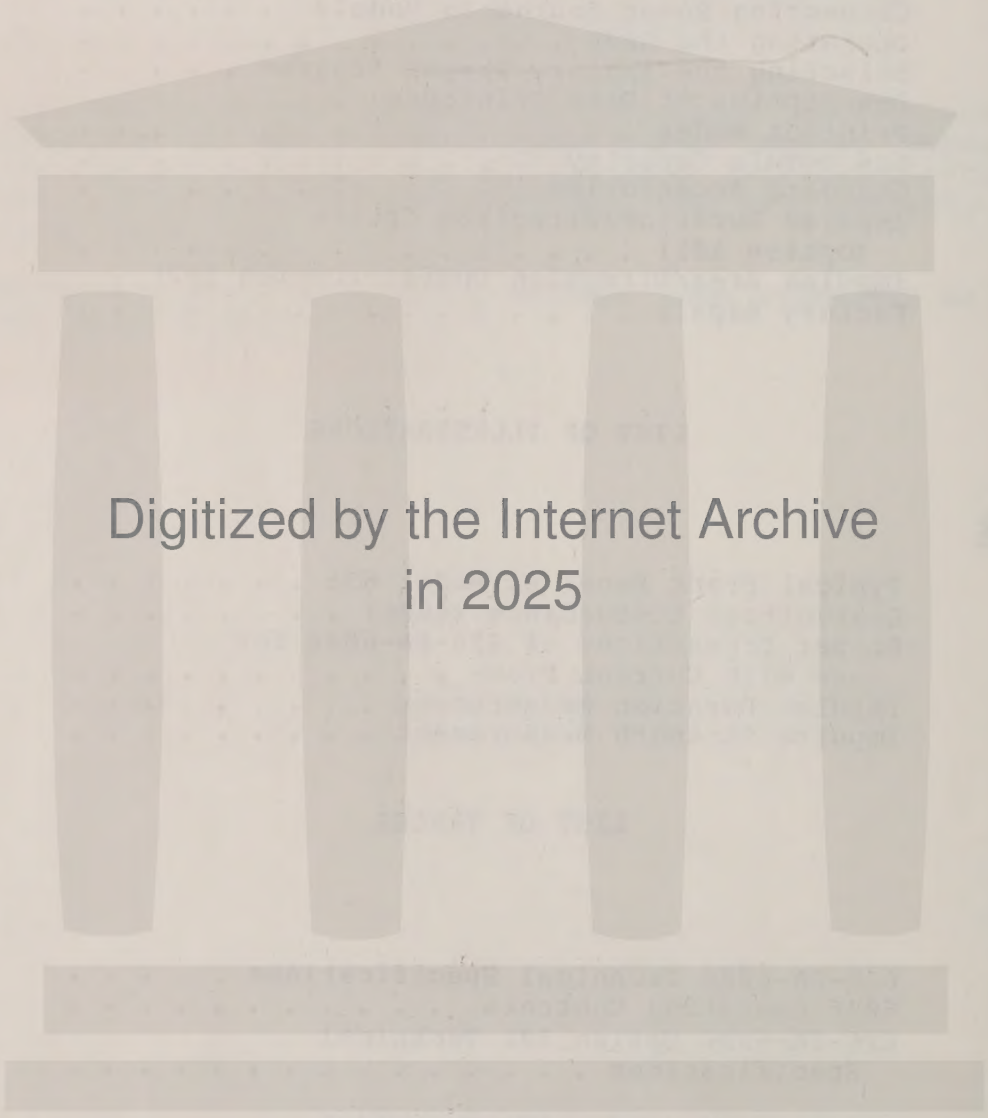
		PAGE
1	Introduction	1
2	Purpose	1
3	Equipment Characteristics	2
4	Installation	3
5	Connecting Power Source to Module	3
6	Operating the 6006	4
7	Selecting the Factory Preset Program	8
8	Description of Data Printouts	8
9	Printout Modes	9
10	626 Module Capacity	13
11	Standard Accessories	13
12	Impulse Duration/Direction Option (Option 101)	13
13	Impulse Area/Direction Option (Option 102)	17
14	Factory Repair	20

LIST OF ILLUSTRATIONS

FIGURE		PAGE
1	Typical Front Panel of Model 626	6
2	Overvoltage Disturbance (6006)	10
3	Proper Connections of 626-PA-6006 for use With Current Probe	16
4	Impulse Duration Measurement	18
5	Impulse Strength Measurement	21

LIST OF TABLES

TABLE		PAGE
1	626-PA-6006 Technical Specifications	2
2	6006 Operating Controls	5
3	626-PA-6006 Option 101 Technical Specifications	14
4	626-PA-6006 Option 102 Technical Specifications	17



Digitized by the Internet Archive
in 2025

https://archive.org/details/manualsplus_09816

626-PA-6006 AC NEUTRAL MONITOR

INTRODUCTION

This manual provides operating instructions for the 626-PA-6006 AC Neutral Monitor Plug-in, hereinafter referred to as the 6006. The 6006 is designed for installation in the Model 626 Universal Disturbance Analyzer. It is assumed that the reader is familiar with the mainframe information presented in TM-106650U.

PURPOSE

The 6006 monitors activity on power system neutral lines with respect to earth ground. With thresholds programmed by the user, the 6006 stores, analyzes, classifies and prints out quantitive and qualitative disturbance data. Accompanying the data is a printout of time, derived from a highly accurate crystal controlled 24-hour clock in the mainframe. This single channel unit finds application in all distribution systems having a designated neutral conductor and operating below 600V rms.

The 6006 has a single voltage range that extends from 2V rms to 50V rms. It monitors two types of disturbances: power frequency transients and waveform disturbances. Power frequency transients are divided into three display categories: overvoltage, voltage change, and voltage surge. Since voltage on the neutral line is nominally zero with respect to earth ground, lower voltage limits are not used and voltage sag and undervoltage printouts are not generated. Waveform disturbances, identified as "impulses", are sharp deviations of short duration compared to line frequency) from the normal waveform. The 6006 measures both peak amplitude of impulses and their polarity. When equipped with an option board the 6006 also measures pulse duration and direction of origin.

The threshold value of each type of disturbance, above which detection and printout occur, is operator programmable. Except for an automatic summary printout at the end of each day, disturbance data is normally printed out only when disturbances occur. In an alternate mode, a disturbance data summary printout occurs only at the end of each day. This feature permits long term unattended operation.

The threshold program may be easily altered, using the front panel switches. Cueing indicators adjacent to the programming switches simplify the programming procedure. A back-up program for the plug-in, stored in non-volatile memory at the factory, may always be recalled upon operator demand. Both the program and the disturbance data in the data accumulators may be printed out upon demand.

3 EQUIPMENT CHARACTERISTICS

The 6006 is configured as a plug-in module 6.5" high by 1.25" wide by 10" deep. It is designed for installation in any of the five slots of the Model 626 Universal Disturbance Analyzer. Technical specifications of the 6006 are listed in Table 1.

Table 1. 626-PA-6006 Technical Specifications

Input	2-wire differential Z_{in} = 40 Megohms plus 10 pf (each side to ground)
Voltage Range	2 - 50V rms 45 - 65 Hz
User-set Upper Limit Voltage	3 - 30V rms
Voltage Change Sensitivity (1V increments)	1 - 9 Volts
Line Voltage Measurement Accuracy	+/-1% of reading, +/-0.2% of F.S. at calibration frequency of 50 or 60 Hz. Additional +/-1% at frequency extremes.
Impulse Ranges (Determined by Impulse Threshold Selection)	25 - 1000V for 25 to 100V thresholds 101 - 2000V for 101 to 200V thresholds 201 - 4000V for 201 to 4000V thresholds
Impulse Duration Range	2 mSec to 1 uSec for amplitude information only.
Impulse Threshold	25 - 4000V in 1 volt increments.
Impulse Amplitude Accuracy	+/-5% of reading +/-1% F.S. for half-sinewave impulses 10 uSec in duration regardless of polarity. Error increases to +/-10% of reading, +/-1/% F.S. at 5 uSec and 50 uSec pulse durations, and is typically -6dB at 2 mSec and 1 uSec pulse durations.

INSTALLATION

To install the 6006 in the mainframe, proceed as follows:

CAUTION; Be sure unit is turned off.

a. Position the top and bottom rear corners of the plug-in module in the upper and lower tracks at the desired slot position at the rear of the mainframe.

b. Carefully slide the module into the mainframe until it is firmly seated.

c. Tighten the top and bottom captive screws to secure the module to the mainframe.

CONNECTING POWER SOURCE TO MODULE

The 6006 is supplied with a barrier type terminal strip under a small cover (626-PA-6006-1) or with a three pin connector (626-PA-6006-2) located at the rear of the module. Proceed as follows:

a. Insert key in FUNCTION key switch on front panel of mainframe and set switch to OFF position.

b. Turn off AC power to the line that is to be monitored.

c. Remove the terminal strip safety cover to expose the connections. Connect the neutral line to the terminal designated "+". Connect the earth ground point used for measurement reference to the terminal designated "-". Connect safety earth ground to terminal marked ⏚. When all connections have been made, be sure to replace the terminal block cover, then reapply AC power.

d. If a voltage input connector is installed on the rear panel of the 6006, the AC source to be monitored should be wired to the cable assembly (DEL #110487-G1) supplied with the module. If the supplied cable is not adequate, the mating connector can be obtained from AMP, INC. The part numbers are as follows:

Part Number	Description
1-480700-0	CONNECTOR HOUSING
1-640720-0	STRAIN RELIEF
350690-1	PIN CONTACTS

Attach wired mating connector to the rear panel connector then reapply AC power.

WARNING

Because of possible shock or fire hazards, connection of this instrument should be performed in compliance with the National Electric Code (ANSI C1) and/or any other requirements applicable to the user. Installation, operation, and maintenance should be performed only by qualified personnel.

CAUTION

To avoid damaging the equipment, do not apply AC voltage in excess of 600V rms to the 6006.

6 OPERATING THE 6006

6.1 Operating Controls and Indicators

The functions of the mainframe operating controls and indicators associated with 6006 operation are described in Table 2. Figure 1 shows the typical front panel controls on a Model 626. For a description of controls common to overall Model 626 operation, refer to TM-106650.

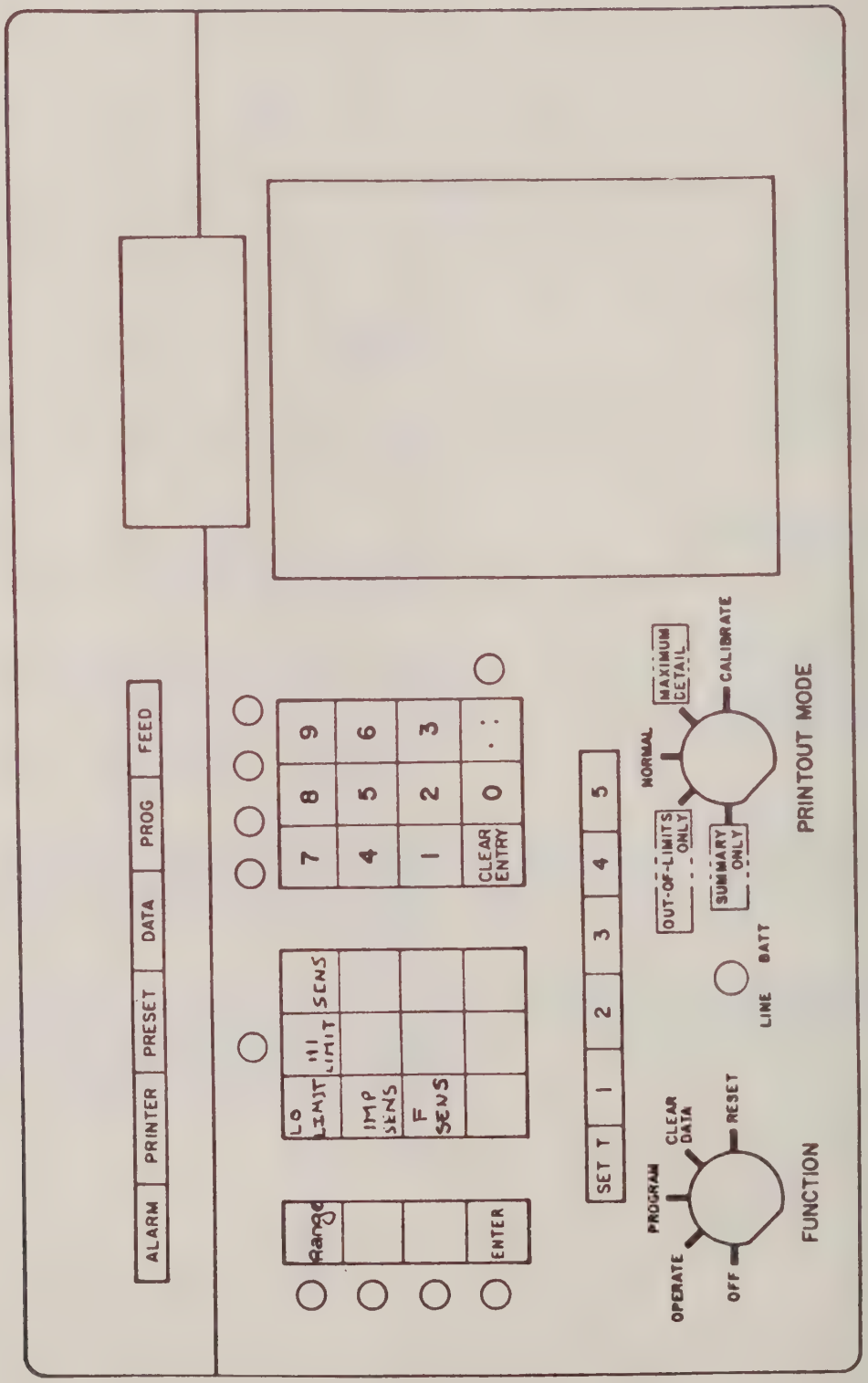
6.2 Programming Procedure

Assume it is desired to program a high limit of 20V, a voltage sensitivity of 2 volts, and an impulse sensitivity of 75V. Sensitivity sets the deviation from the present value above or below which a detected value produces a recorded disturbance.

Impulse ranges are set up automatically in accordance with pulse sensitivity selected. Thus, selection of an impulse sensitivity of 75V automatically produces an impulse range of 25 to 1000V (See Table 1).

Table 2. 6006 Operating Controls

Item	Function
HI LIMIT pushbutton	When depressed, enables numeric keyboard to program high limit voltage.
SENS pushbutton	When depressed, enables numeric keyboard to program voltage sensitivity value.
IMP SENS pushbutton	When depressed, enables numeric keyboard to program impulse voltage sensitivity value.
ENTER pushbutton	When depressed, transfers numeric keyboard value into the 6006 memory.
DATA pushbutton	When depressed, produces data summary printout. (Functions in operate mode only.)
PROG pushbutton	When depressed, unit prints time and a summary of the program (threshold settings) in each channel in sequence (1-5). (Functions in operate mode only.)
PRESET pushbutton	With FUNCTION switch set to PROGRAM and a channel switch (1-5) depressed, depressing PRESET switch recalls non-volatile factory program for that channel.


ALARM
PRINTER
PRESET
DATA
PROG
FEED
Range
ENTER
LO LIMIT
HI LIMIT
SENS
IMP SENS
F SENS
7
8
9
4
5
6
1
2
3
CLEAR ENTRY
0
. :
SET T
1
2
3
4
5
NORMAL
MAXIMUM DETAIL
CALIBRATE
OUT-OF-LIMITS ONLY
SUMMARY ONLY
PROGRAM
CLEAR DATA
RESET
OPERATE
OFF
LINE
BATT
FUNCTION
PRINTOUT MODE

or impulse measurements, the sensitivity corresponds to the absolute nreshold, so that an impulse sensitivity of 75 volts, a disturbance is ecorded when impulse amplitude rises above 75 volts.

or the example cited, program the 6006 as follows:

a. Set FUNCTION switch to PROGRAM.

b. Depress the channel pushbutton (1-5) that corresponds to the lot position of the plug-in to be programmed. Note that a program ummary for that channel is immediately printed.

c. Note that the cueing lamp above the center bank of pushbuttons ights. This indicates that one of the functions in that pushbutton ank is to be selected. Depress the HI LIMIT pushbutton.

d. Note that two lamps above the numeric keyboard now light. Enter Ø using the keyboard. As each digit is entered, one lamp goes out. If n error is made, depress CLEAR ENTRY and correct the entry.

e. When the high limit value has been programmed, the lamp next to he ENTER pushbutton lights. Depress this pushbutton to enter the alue. The high limit entry (V HIGH LIMIT 20V) will now be echoed back n the printout.

f. When the ENTER indicator goes out, the indicator above the enter bank of pushbuttons lights again. This indicates that another unction may be programmed.

g. Depress the SENS pushbutton. Program the voltage sensitivity alue (2) as in step d.

h. When the ENTER indicator lights, depress the ENTER pushbutton. he programmed voltage sensitivity value will be echoed back on the rintout.

i. Repeat steps f, g, and h for the impulse sensitivity (ØØ75), sing the IMP SENS pushbutton.

j. When the plug-in program is completed, the user may proceed to rogram another module (by depressing another channel number) or he may lace the instrument on line by setting the FUNCTION switch to OPERATE. hile on line, the program in effect may be obtained by simply epressing the PROG pushbutton.

7 SELECTING THE FACTORY PRESET PROGRAM

To select the program stored in non-volatile memory, set the FUNCTION switch to PROGRAM and depress the channel number desired. The last operator-set program will be printed out. Now depress the PRESET pushbutton to recall the factory-set program. Unless specially modified to customer requirements, the factory-set program for the 6006 is as follows:

```
IMPULSE SENS   Ø1ØØV
VOLTAGE SENS   ØØ2V
V HIGH LIMIT   Ø5V
  626-PA-6ØØ6
      CH 1
PROGRAM SUMMARY
```

8 DESCRIPTION OF DATA PRINTOUTS

When any of the disturbances described below is detected by the 6006, it is recorded and displayed as illustrated in the following paragraphs.

8.1 Overvoltage

An overvoltage condition exists when the monitored power line neutral voltage exceeds the user specified upper limit for more than 2.55 seconds. An overvoltage condition is indicated by a printout such as the following:

```
4 HIGH 12:34:56.78
```

where 4 is the channel number and time is given in hours, minutes and seconds (to .Ø1 sec resolution).

When the line voltage recovers to normal, a printout such as the following occurs:

```
4 NORM 12:36:14.56
   35.8 V MAX
```

indicating when normal voltage was restored and the value of the highest voltage reached during the overvoltage interval.

8.2 Voltage Change

A voltage change printout is triggered when the neutral to ground voltage changes more than a preselected amount from the last printed value. The voltage change sensitivity is a user selected integral voltage between one and 9 volts. The following example shows several voltage change printouts:

Printout	Remarks
2 INC Ø1:Ø2:34.58 15.4V	Voltage increased to 15.4V at time shown
2 DEC Ø1.Ø1:34.56 9.2V	Voltage decreased to 9.2V at time shown

8.3 Voltage Surge

A Voltage Surge is defined as line voltage which increases through a user-selected upper limit and then returns to an in-tolerance condition in less than 2.56 seconds. When a surge begins, its starting time is printed as follows:

```
3 HIGH  12:34:50.49
```

When the line voltage returns to a normal level following a Surge condition, a message such as the following will be printed:

```
3 NORM 12:34:51.59
  35.2 V MAX
 SURGE 1.10 SEC
```

In this case, the time at which the voltage returned to normal is shown as well as the maximum voltage reached and the surge duration.

8.4 Impulses

"Impulse" disturbances represent any line perturbation which contains frequency components in the 300Hz to 500Hz range. An impulse type disturbance produces a printout such as the following:

```
2 IMP 10:12:13.45
  +0139 V PK
```

This printout indicates that an impulse which deviated from normal neutral line voltage by +139 volts peak was detected on channel 2 at the time shown. The "+" indicates the impulse was positive with respect to the signal return (-) terminal on the rear panel of the 6006.

9 PRINTOUT MODES

The setting of the PRINTOUT MODE switch on the front panel of the mainframe determines how much detail is printed out. Printout data is reduced as the switch is rotated counterclockwise.

The following example printouts show how various settings of the PRINTOUT MODE switch change the amount of detail in the printed record of a disturbance. It is assumed that the disturbances occurred in Channel 1 and that the limits for Channel 1 were programmed as follows:

```
V HIGH  LIMIT    20Vrms
V SENSITIVITY     2Vrms
```

The example printouts are referenced to figure 2 which illustrates an overvoltage disturbance.

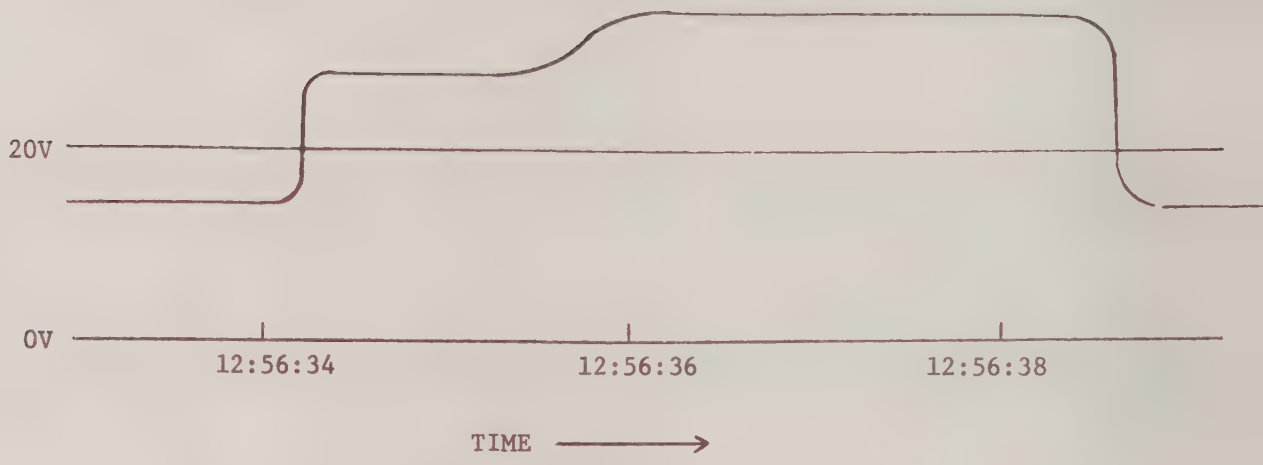


Figure 2. Overvoltage Disturbance (6006)

Disturbances which occur while the PRINTOUT MODE switch is in the SUMMARY ONLY position do not generate individual printouts but they are stored in the daily accumulator and are automatically printed each day at midnight (worst case event and number of occurrences in each category). This printout may also be triggered manually by depressing the DATA button.

```
1 NORM 12:56:38.51
  34.1 V MAX

1 HIGH 12:56:34.21
```

Printout of overvoltage (fig. 2) in OUT-OF-LIMITS ONLY mode.

```
1 NORM 12:56:38.51
  34.1 V MAX

1 DEC 12:56:38.50
  25.2 V

1 INC 12:56:35.78
  32.3 V

1 INC 12:56:35.62
  30.3 V

1 inc 12:56:35.40
  28.3 v

1 INC 12:56:34.22
  26.3 V

1 INC 12:56:34.21
  24.2 V

1 HIGH 12:56:34.21
```

(READ UP)

Printout of overvoltage (fig. 2) in NORMAL mode.

```
1 DEC 12:56:38.61
  14.8 V

1 DEC 12:56:38.53
  16.8 V

1 DEC 12:56:38.51
  19.0 V

1 NORM 12:56:38.51
  34.1 V MAX

1 DEC 12:56:38.50
  25.2 V

1 INC 12:56:35.78
  32.3 V

1 INC 12:56:35.62
  30.3 V

1  INC 12:56:35.40
  28.3 V

1 INC 12:56:34.22
  26.3 V

1 INC 12:56:34.21
  24.2 V

1 HIGH 12:56:34.21

1 INC 12:56:34.20
  16.1 V
```

Printout of overvoltage (fig. 2) in MAXIMUM DETAIL mode

9.1 System Check

When the Printout Mode Switch is set to CALIBRATE, a source of precise signals is applied to the front end circuitry of the 6006. Any inputs that are connected at this time will be automatically disconnected for the system check period. These signals fully verify the functionality of the module. The signals and the allowable tolerance levels are described below.

9.2 System Check Signal Levels

Impulse: +160V pk
Voltage: 30.0 Vrms

9.3 System Check Signal Tolerances

Impulse: +134 to +186V pk
Voltage: 29.6 to 30.4V rms

10 626 MODULE CAPACITY

The 626 standard mainframe has an upper limit of the total load rating of the installed modules. The overall mainframe capacity is set at 13 units, and individual modules have load ratings as follows:

Plug-in	Load Rating
626-PA-6001	2 Units
626-PA-6001 with extra Option Board	3 Units
626-PA-6002	2 Units
626-PA-6003	4 Units
626-PA-6006	2 Units
626-PA-6006 with extra Option Board	3 Units
626-PA-6007	1 Unit
626-PA-6008	2 Units
626-PA-6009	4 Units
626-PA-6011	1 Unit
626-PA-6012	3 Units
626-PA-6014	1 Unit

When selecting modules for installation in any mainframe, simply verify that the load rating sum of the installed modules does not exceed 13.

11 STANDARD ACCESSORIES

Model No.	Part No.	Quantity	Description
626-PA-6006-1	TM-110390AU Vol. I	1	Operator's Manual
626-PA-6006-2	TM-110390AU Vol. I	1	Operator's Manual
626-PA-6006-2	110487-G1	1	Input Cable with Tinned Leads

12 IMPULSE DURATION/DIRECTION OPTION, OPTION 101 FOR 626-PA-6006 PLUG-IN (NOT COMPATIBLE WITH OPTION 102)

12.1 Introduction

The following paragraphs describe the differences between the 6006 with Option 101 and the standard 6006. The information that follows supersedes that found in previous paragraphs of this manual unless otherwise stated.

12.2 Purpose

Option 101 has no effect on the neutral to ground voltage measurements of the 6006 described in paragraph 2. It also does not affect the measurement of impulse polarity and peak voltage. Option 101 is designed to provide information on impulse duration. In addition, if the current probe is used, direction of origin will be determined for impulses having a current of 1 Amp or greater at the time of measurement.

12.3 Equipment Characteristics

Technical specifications for Option 101 are listed in Table 3. all specifications for the 6006 listed in Table 1 still apply.

Table 3. 626-PA-6006 Option 101 Technical Specification

IMPULSE DURATION

Range: 1 uSec to 1023 uSec

Accuracy: +/-6% of reading +/-0.3% F.S. for 1/2 sinewave pulses up to 100 uSec duration greater than 100 Vpk. Typically - 10% at 200 uSec, -20% at 400 uSec, -50% at 1000 uSec.

Timing Reference Points: Start at 25V - stop at 30% of Vpk.

Minimum Impulse Voltage: 50 Vpk

IMPULSE DIRECTION OF ORIGIN

Minimum Impulse Current: 1 Amp for 0.1 uSec before and after measurement.

Minimum Impulse Voltage: 50 Vpk

12.4 Installation in Mainframe

The module is installed in the mainframe in the same manner as the standard 6006 described in paragraph 4.

12.5 Connections to the Module

Connecting the 6006 to the line to be monitored is the same as described in paragraph 5. If impulse direction information is required, the current probe must be connected in the following manner.

a.) Turn off AC power to the line that is to be monitored.

b.) Attach the current probe connector to its mating connector on the rear panel of the 6006.

c.) Install current probe on the line which is connected to the neutral voltage terminal of the corresponding channel, being sure that the LOAD and SOURCE markings on the probe are oriented such that SOURCE is toward incoming power. Proper connections are shown in figure 3.

d.) Reapply AC power.

Note: Printouts of impulse direction of origin will correlate with the orientation of the LOAD and SOURCE markings on the current probe.

2.6 Operating the 6006 With Option 101

Operation of the 6006 with Option 101 requires no additional programming steps. Programming is the same as described in paragraphs 6 and 7.

2.7 Description of Data Printouts

The only printouts affected by the addition of Option 101 are those for module identification and impulse data.

When a Program Summary is printed out, the module will be identified as 626-PA-6006R1 as in the following example.

```
                IMPULSE SENS 0100V
Read            VOLTAGE SENS 002V
up              V HIGH LIMIT 125V
                  626-PA-6006R1
                      CH1
                 PROGRAM SUMMARY
```

IMPULSE

A minimum impulse of 50 Vpk is required to obtain duration data. For information on the direction of origin a minimum impulse voltage of 50 Vpk and a minimum impulse current of 1 Amp is required.

If the current probe is not used or if it is used but the impulse current is less than 1 Amp at the time of measurement, the printout will take on the following form:

```
4 IMP 12:34:56.88
+2057V, 089uS
```

This printout indicates that an impulse which deviated from the normal line voltage for 89 microseconds with a peak voltage of 2057 volts was detected on channel 4 at the time shown. The "+" preceding the impulse voltage indicates that the impulse was positive with respect to the ground terminal on the 6006 rear panel.

IMPULSE WITH DIRECTION

When the current probe is used and the impulse current is greater than 1 Amp at the time of measurement, the printout will take the following form:

```
4 IMP 12:34:57.00
+2057V, LOAD, 089uS
```

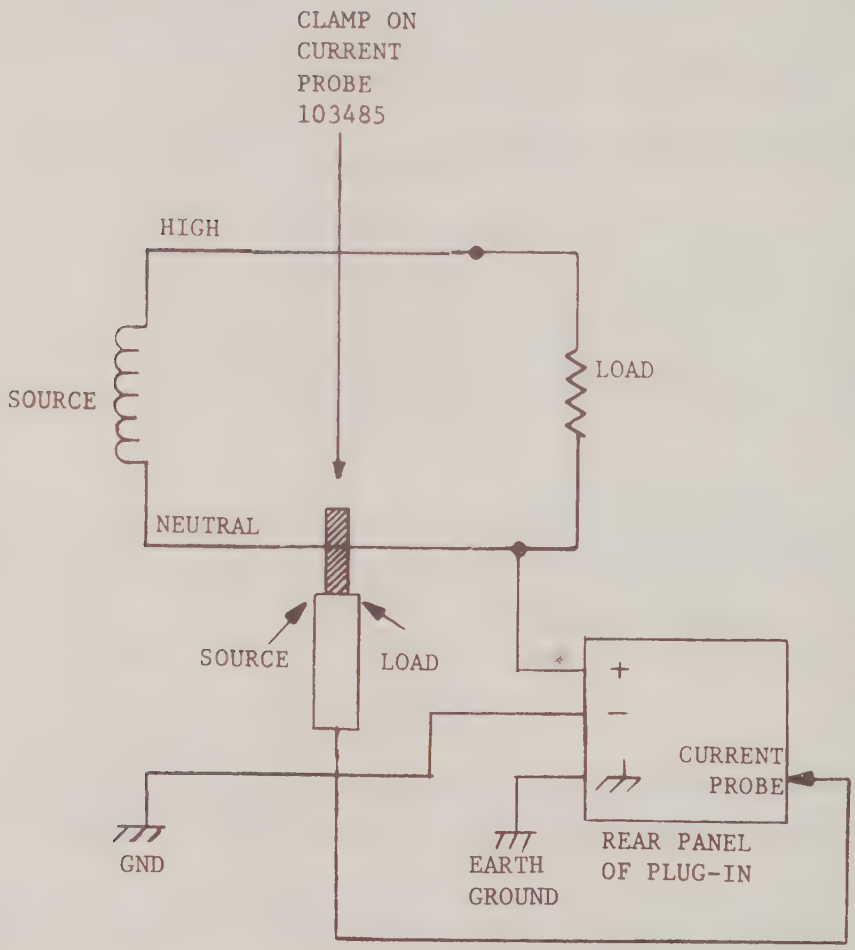


Figure 3. Proper Connections of 626-PA-6006 for Use with Current Probe

This printout indicates that an impulse originating from the load, of +2057 volts peak and 89 microseconds in duration, occurred at the time shown. If the direction had been from the source, SRCE would be printed in place of LOAD in the example.

Figure 4 illustrates an impulse duration measurement.

12.8 Printout Modes

Printout modes and calibration signals remain the same as in the standard 6006 described in paragraph 9.

13 IMPULSE AREA/DIRECTION OPTION, OPTION 102 FOR 626-PA-6006 PLUG-IN (NOT COMPATIBLE WITH OPTION 101)

The following paragraphs describe the differences between the 6006 with Option 102 and the standard 6006. The information that follows supersedes that found in previous paragraphs of this manual unless otherwise stated.

13.2 Purpose

Option 102 has no effect on the neutral-to-ground voltage measurements of the 6006 described in paragraph 2. It also does not affect the measurement of impulse polarity and peak voltage. Option 102 is designed to provide information on impulse area. In addition, if the current probe is used, direction of origin will be determined for impulses having a current of 1 Amp or greater at the time of measurement.

13.3 Equipment Characteristics

Technical specifications for Option 102 are listed in Table 4. All specifications for the 6006, listed in Table 1, still apply.

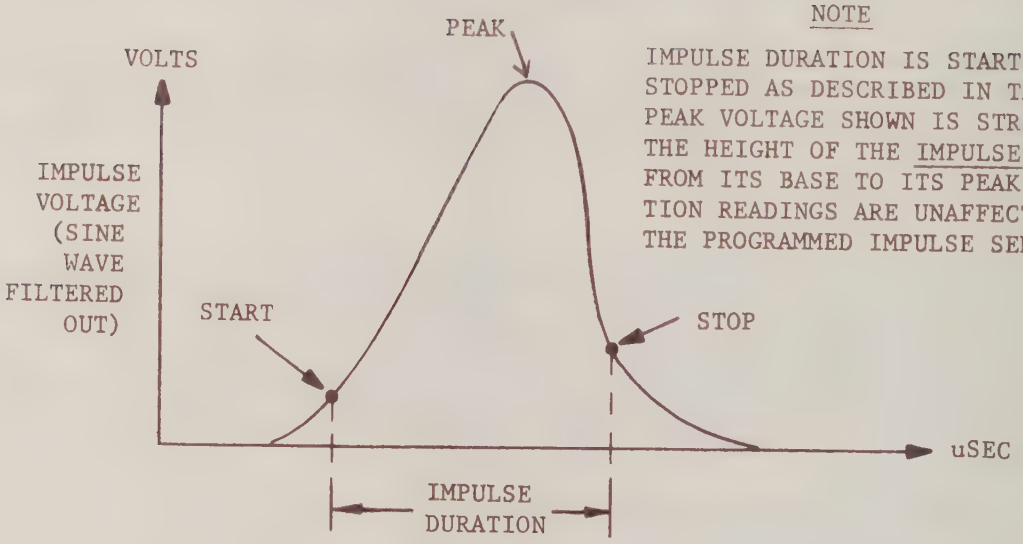
Table 4. 626-PA-6006 Option 102 Technical Specifications

IMPULSE AREA

Range:	0.0002 to 0.2046 V-Sec
Accuracy:	+/-10% of reading, +/-0.1% of F.S. for 1/2 sinewave pulses up to 100 uSec duration greater than 100 Vpk. Typically -20% at 200 uSec, -50% at 500 uSec.
Timing Reference Points:	Start at 25V - stop at 30% of Vpk.
Minimum Impulse Voltage:	50 Vpk

IMPULSE DIRECTION OF ORIGIN

Minimum Impulse Current:	1 Amp for 0.1 uSec before and after measurement.
Minimum Impulse Voltage:	50 Vpk



NOTE

IMPULSE DURATION IS STARTED AND STOPPED AS DESCRIBED IN TABLE 3. PEAK VOLTAGE SHOWN IS STRICTLY THE HEIGHT OF THE IMPULSE ALONE, FROM ITS BASE TO ITS PEAK. DURATION READINGS ARE UNAFFECTED BY THE PROGRAMMED IMPULSE SENSITIVITY.

Figure 4. Impulse Duration Measurement

3.4 Installation in Mainframe

The module is installed in the mainframe in the same manner as the standard 6006 described in paragraph 4.

3.5 Connections to the Module

Connecting the 6006 to the line to be monitored is the same as described in paragraph 5. If impulse direction information is required, the current probe must be connected as described in paragraph 12.5.

3.6 Operating the 6006 With Option 102

Operation of the 6006 with Option 102 requires no additional programming steps. Programming is the same as described in paragraphs 6 and 7.

3.7 Description of Data Printouts

The only printouts affected by the addition of Option 102 are those for module identification and impulse data.

When a Program Summary is printed out, the module will be identified as a 626-PA-6006R2 as in the following example.

```
    ↑       IMPULSE SENS 0100V
 Read       VOLTAGE SENS 002V
   Up       V HIGH LIMIT  25V
   |          626-PA-6006R2
                 CH1
            PROGRAM SUMMARY
```

IMPULSE

A minimum impulse voltage of 50 Vpk is required to obtain area data. For information on the direction of origin, a minimum impulse voltage of 50 Vpk and a minimum impulse current of 1 Amp is required.

If the current probe is not used, or if it is used but the impulse current is less than 1 Amp at the time of measurement, the printout will take the following form:

```
4 IMP 12:34:56.88
0.0156 V-SEC
+2057V
```

This printout indicates that an impulse which deviated from the normal line voltage with an area of 0.0156V-Sec and a peak voltage of 2057 volts was detected on channel 4 at the time shown. The "+" preceding the impulse voltage indicates that the impulse was positive with respect to the ground terminal on the 6006 rear panel.

IMPULSE WITH DIRECTION

When the current probe is used and the impulse current is greater than 1 Amp at the time of measurement, the printout will take the form of the following:

```
4 IMP 12:34:57.00
0.0156 V-SEC
+2057V, LOAD
```

This printout indicates that an impulse originating from the load, of +2057 volts peak and an area of 0.0156V-Sec, occurred at the time shown. If the direction had been from the source, SRCE would be printed in place of LOAD in the example.

Figure 5 illustrates an impulse strength (area) measurement.

13.8 Printout Modes

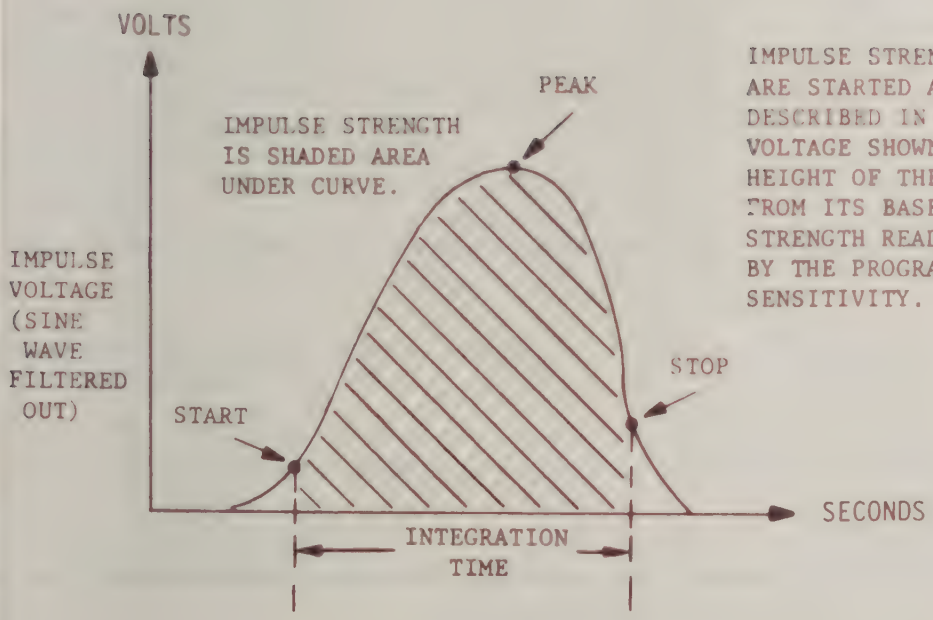
Printout modes and calibration signals remain the same as in the standard 6006 described in paragraph 9.

14 FACTORY REPAIR

When factory repair is desired, proceed as follows:

1. Contact the Dranetz Technologies Service Department and obtain an Authorization Number.

2. Fill out the Repair/Service Order enclosed in this manual and ship it with the equipment to the Customer Service Department.



NOTE

IMPULSE STRENGTH MEASUREMENTS ARE STARTED AND STOPPED AS DESCRIBED IN TABLE 4. PEAK VOLTAGE SHOWN IS STRICTLY THE HEIGHT OF THE IMPULSE ALONE, FROM ITS BASE TO ITS PEAK. STRENGTH READINGS ARE UNAFFECTED BY THE PROGRAMMED IMPULSE SENSITIVITY.

Figure 5. Impulse Strength Measurement

CUSTOMER SERVICE DEPT.
DRANETZ ENG. LABS., INC.
1000 New Durham Road, CN-91
Edison, New Jersey 08818

REPAIR/SERVICE ORDER

TEL. (201) 287-3680
(201) 287-2535
TWX: (710) 997-9553
CABLE: DRANETZ

NOTE: THIS COMPLETED FORM MUST ACCOMPANY RETURNED EQUIPMENT

CUSTOMER SHIPPING & BILLING INFORMATION

CUSTOMER P. O. # _____ P. O. DATE _____

SHIP TO: _____ INVOICE TO: _____

In Continental U. S., material will be returned by Dranetz to you by UPS, UPS Blue or other carrier chosen by Dranetz unless otherwise designated.

EQUIPMENT BEING RETURNED

Date of Original Purchase: _____ Original P. O. # _____

Model No. _____ S/N _____

Model No. _____ S/N _____

Ancillary equipment also being returned (If you neglect this, these items may not be returned to you).

☐ Power & Other Cables _____ ☐ Instr. Book _____

☐ Plug-ins (incl. S/N) _____ ☐ Connectors _____

☐ Other _____

RETURN AUTHORIZATION

Have you discussed the problem with Dranetz Sales or Service personnel?

Dranetz Return Authorization # _____

By: _____

If so, with whom _____ Date: _____

Whom should the Dranetz Customer Service Dept. contact for technical questions?

( )

NAME (Print) DEPARTMENT TELEPHONE

DESCRIPTION OF PROBLEM

Please be detailed, explicit and complete. Include test data, if this helps to describe the problem.
IMPORTANT: Repairs cannot be made unless this section is completely filled out.
(Attach added sheets if necessary)

CHECK WHERE APPLICABLE: IS MALFUNCTION RELATED TO: Warmup ☐ Temperature ☐

Intermittency ☐ Mechanical Handling ☐ Visual Defects ☐ Grounding ☐ Test Data Attached ☐

INITIATOR OF THIS ORDER

NAME/TITLE SIGNATURE TELEPHONE

(SEE OTHER SIDE FOR INSTRUCTIONS)

IMPORTANT (ENCLOSE THIS ENTIRE FORM WITH EQUIPMENT)

INSTRUCTIONS FOR REPAIR ORDER – DRANETZ ENGINEERING LABS.

IMPORTANT: FOLLOW INSTRUCTIONS & USE THIS FORM. IT IS DESIGNED TO HELP US HELP YOU.

1. Before returning equipment to our factory, call our Customer Service Department, Tel:(201) 287-2535 Give the model No., serial number, and information on the problem.

   A. Our specialists may be able to solve your problem rapidly without equipment return.

   B. If equipment return is needed, you will be supplied with appropriate instructions and authorization information to expedite service.

2. If return is to be made,

   A. Fill out the other side of this form COMPLETELY.

   B. Enclose original of form INSIDE the shipping carton, preferably attached by masking tape to the equipment.

   C. Ship prepaid (including insurance); we will return prepaid unless otherwise advised by you.

   D. IMPORTANT - PACK PROPERLY! SHIPPING DAMAGE WILL BE CHARGED TO YOU!

NOTE:

Statement of Warranty - All products of Dranetz Eng. Labs., Inc. are warranted to the original purchaser against defective material and workmanship for a period of one year from the date of delivery. Dranetz will repair or replace, at its option, all defective equipment returned, freight prepaid, during the warranty period, without charge for repair, provided there is no evidence that the equipment has been mishandled or abused.

FILL OUT OPPOSITE SIDE OF THIS FORM AND RETURN WITH EQUIPMENT.

MP MASTER
MA23086

INSTRUCTIONS FOR REPAIR ORDER – DRANETZ ENGINEERING LABS.